IMPACTED MATERIALS PLACEMENT PLAN
ON-SITE DISPOSAL FACILITY

Revision 3
October 2001
20100-PL-007

United States Department of Energy

Fernald Environmental Management Project
Fernald, Ohio

Prepared by

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Under

Fluor Fernald, Inc.
Contract 95PS005028

REVISION SUMMARY

Revision	Dated	Description of Revision
0	1/19/98	Initial issuance of Revision 0, *Impacted Material Placement Plan, On-Site Disposal Facility* (20100-PL-007)
PCN 1	7/7/98	Added Revision Summary page and revised physical waste acceptance criteria for debris (Page 4-1) to reflect that transite panels will not be size reduced before disposal in the On-Site Disposal Facility
0 ADD 1	2/17/99	Addendum 1: Issuance of Revision 0, *Specialized Placement Plan for Bagged Impacted Material* to discuss placement of bagged material into the On-Site Disposal Facility
1	10/99	Issuance of Revision 1 based on page changes approved by the U.S. EPA and OEPA. Addendum 1 incorporated into Appendix C
1ADD2	3/00	Addendum 2: Issuance of Revision 1, *Specialized Placement Plan for Thyorium and Non-Bagged Impacted Material* to discuss placement of thorium debris and non-bagged material into the On-Site Disposal Facility
1ADD3C	3/00	Addendum 3: Issuance of Revision 1, *Alternative Trenching Method for Placement of Category 2 Impacted Material* to discuss placement of Category 2 items by trenching method into the On-Site Disposal Facility
1TBL1	3/00	Added *Placement Restrictions for Specialized Placement Plans* table to be inserted in front of Addendum 1 of Appendix C.
1 PCN 1	12/19/00	Revised Category 4 material definition to replace the words "very compressible" with "prone to decomposition" (page 5-2 and 8-5).
2	5/01	Issuance of Revision 2 to incorporate lessons learned from OSDF Phase I and II and DCN 20102-033 dated 1 July 1998. Addenda 2 and 3 incorporated into Appendix C.
2 PCN 1	6/01	Added liner sludge placement procedure to Section 8.6.5 based on RCI 20102-068R dated 20 June 2000.
3	7/01	Issuance of Revision 3 to incorporate 2 PCN 1.
3PCN1	10/01	Added alternate placement requirements for Category 3 materials (transite panels) to Section 8.4.

8.0 SPECIAL PLACEMENT REQUIREMENTS

8.1 Introduction

This IMP Plan requires special procedures for the placement of the non-soil-like materials (Categories 2 through 5). The non-soil-like materials consist primarily of impacted materials from the Solid Waste Landfill, the Lime Sludge Ponds, and impacted debris resulting from demolition of structures within the FEMP former production area. The impacted debris consists primarily of building superstructure (*i.e.*, steel, masonry, transite, and other finish components), concrete floor slabs, and building substructure (*i.e.*, concrete footings, pads, and other components).

8.2 Location Recording and Surveying

The Contractor shall identify the locations of placement of each horizon of Category 2 through 5 impacted material as it is placed in the OSDF. For each horizon the Contractor shall establish the horizontal location within 100 ft gridlines and the vertical location by lift The Contractor shall survey the impacted material in accordance with the Technical Specifications. Where appropriate, sketches of placement of Category 2 through 5 materials should be provided by the Contractor to show the general orientation and layout of individual and special items.

The Contractor shall maintain the grid markers around the perimeter of the cell(s) receiving impacted material. The grid markers shall be visible from the working face. These grid markers are to be placed to a 1 ft horizontal tolerance.

8.3 Category 2 Material (*En Masse* Placement)

8.3.1 Placement Procedures

Materials conforming to the Category 2 (*en masse* placement) definition shall be placed in the OSDF in loose lifts not exceeding 21 in. ±3 in. in thickness. The ±3 in. tolerance is to allow for the occasional piece of rebar, structural steel, or other material that may protrude from the material placed and material that cannot be readily removed or replaced within the 21 in. limit. Prior to placement of a lift of Category 2 material, the placement grid shall be designated such that the grid can be isolated horizontally on all sides with a minimum of 10 ft of Category 1 material. Category 2 material shall then be placed within the designated placement grid to a loose thickness of not more than 21 in. ±3 in. Initial compaction shall be accomplished as the

material is spread by tracking with a bulldozer of a minimum total weight of 50,000 lbs producing a ground pressure of at least 10 psi or with a landfill compactor (e.g., Caterpillar 826, or approved equal). After spreading and initial compaction, Category 1 material (of a granular nature when available) shall be spread over the Category 2 material to bring the layer thickness to approximately 24 in. Prior to placement of a second lift of Category 2 material, Category 1 material shall be constructed at the perimeter of Category 2 material to the height of the Category 2 material and to a width of approximately 10 ft The Category 1 material shall be placed in 12 to 15 inch thick loose lifts as described in Section 7.4 of this IMP Plan.

As Category 2 material is expected to be less compressible than the majority of the materials contained in the OSDF, the material should be spread laterally prior to placing the material vertically above other Category 2 material. However, as it is also expected to be more permeable than other OSDF material, Category 2 material shall not be spread laterally more than 100 ft In all cases, Category 2 material is to be surrounded in the horizontal directions by at least 10 ft of less permeable Category 1 material. This will reduce the potential for significant lateral migration of leachate. Not more than one lift of Category 2 material shall be placed on top of another lift of Category 2 material without at least the required minimum 4 ft thickness of the intervening horizon of Category 1 material.

The Contractor shall mix Category 1 material as much as practicable with the Category 2 material during excavation and placement activities. The objective of this mixing is to fill voids within the Category 2 material, increase the density of the material placed in the OSDF, and aid in the homogenizing of building rubble, demolition debris, and soils.

8.3.2 Compaction Procedures

After each lift of Category 2 material is placed, the material shall be compacted by a minimum four passes of a self-propelled, static pad/blade-foot landfill compactor (*e.g.*, Caterpillar 826, or approved equal). Category 1 material for the 10-ft wide berms surrounding the Category 2 material shall be compacted to at least 90 percent of the standard Proctor maximum dry density determined as described in Section 7.4.2 of this IMP Plan. It is anticipated that the soil compaction moisture content will be within ±3 percentage points of the material's optimum moisture content. Specific requirements for compaction moisture content will be established by the Construction Manager during construction. These requirements will take into account the workability of the Category 1 material, the required shear strength to obtain adequate levels of OSDF stability, moisture contents needed to achieve dust and other fugitive dust control, and material trafficability. After compacting the Category 1 material over the Category 2 material, the Category 1 material shall be proofrolled. Soft spots indicated by tire ruts more

than 3 in. in depth or visible deflection under the moving proofrolling equipment shall be stabilized through additional passes of the compactor. The proofrolling equipment shall have a minimum gross vehicle weight of 20 tons and exert a ground pressure of at least 65 psi. The proofrolling passes shall be overlapped such that one set of tires on each pass runs between the two sets of tire tracks from the previous pass. Any soft spot that cannot be stabilized with further compactive effort shall be cause for additional treatment to the satisfaction of the Construction Manager. This treatment shall consist of removal, replacement, and recompaction of the Category 1 material, and, if needed, infilling soft spots/areas in the Category 2 material with grout or other material approved by the Construction Manager.

8.4 Category 3 Items (Individual Items)

8.4.1 Individual Placement Procedures

Items not more than 4 ft in maximum cross-sectional dimension and of regular geometry can be placed as individual members or packages in the OSDF. As much as possible, groups of individual members or packages shall be similarly and regularly sized to enable their placement in the OSDF in regular patterns. Items shall be placed at least 8 ft apart. Figure 8-1, Part A and Figure 8-2 illustrate the placement of individual bundles of packaged transite panels.

Items having voids with a volume larger than 1 ft^3 shall be filled with a quick-set grout, or flowable cohesionless material approved by the Construction Manager. If a grout is used in this manner, it shall be allowed to set for a minimum of 4 hours prior to the commencement of placement of fill around the item.

Prior to placement of the Category 3 items, the surface of the in-place Category 1 impacted material shall be prepared by rolling with a smooth-drum roller in the area of item placement. The Category 3 items or packages shall be placed on the surface in a regular pattern with an adequate spacing between individual members or packages to allow Category 1 material placement and compaction with available equipment. The space between each member or package shall be filled with Category 1 material placed in 12- to 15-in. thick loose lifts. A final 12- to 15-in. thick loose lift of Category 1 material shall be placed over each grouping of Category 3 items. The Category 1 material shall be placed in 12 to 15 in. thick loose lifts as described in Section 7.4 of this IMP Plan.

As the Category 3 materials are expected to be less compressible than the majority of the impacted materials placed in the OSDF, the Category 3 items should be placed toward the center of the cell, at least 50 ft horizontally from the bottom of the select impacted material layer in the

final cover system, and not in the same horizontal elevation within 100 ft laterally of more compressible materials (*i.e.*, Category 4 materials, and sludges and double-bagged asbestos of Category 5 materials). The 100 ft laterally means a 100 ft separation distance from all directions (i.e., north-south, east-west, diagonally) of placed Category 3 material. Horizons of Category 3 materials shall be separated by at least the required minimum 4 ft thickness of the intervening horizon of Category 1 material.

8.4.2 Alternate Placement Procedure

8.4.2.1 General Requirements

The alternate placement procedures described allow packaged transite panels to be placed in side by side and end to end configurations. The placement of transite panels using alternative methods specified herein shall adhere to the same lateral and vertical separation distances as described in Section 8.4.1. The alternate placement procedures shall not be used in grids where compressible material (i.e., Category 4 materials, sludges, and double-bagged asbestos of Category 5 material) has been placed in a lower horizon. Occupational Health and Safety concerns, including asbestos safe handling methods shall be defined in the work plan or other like documents prepared by the contractor.

The bundles of packaged transite panels shall be placed on the surface of a previously placed horizon of Category 1 intervening layer or 3-ft thick select impacted material layer. This surface shall be prepared by rolling with a smooth-drum roller in the area of transite panel placement. The groups of bundles shall be placed on the surface in the prescribed pattern illustrated in Figure 8-1, Part B. Groups of bundles may be placed adjacent to existing 2-ft high berms constructed for Category 2 grids. Minimum spacing between groups of bundles shown on Figures 8-3 and 8-4 shall be 8 ft to allow Category 1 material placement and compaction with suitable equipment. The space between groups of bundles shall be filled with Category 1 material placed in maximum 12-in. thick compacted lifts. Lifts shall be brought up uniformly around the group of transite bundles. A final 12-in. thick compacted lift of Category 1 material shall be placed over each grouping of bundles. Placement of Category 1 material is illustrated in Figures 8-3 and 8-4.

Whenever possible, place similar size bundles within a group. When more than one size bundle is to be placed in a group, the bundles shall be placed in a manner which does not hamper the placement of Category 1 material. Examples for placing bundles of varying sizes in a group are shown in Figure 8-5. Lifts of Category 1 material shall be brought up uniformly around the group of transite bundles. In the event the bundles are of varying heights, Category 1 material

shall be first placed over the shorter bundles to bring the common surface of the bundles up to the same elevation before the placement of the final overlying lift

8.4.2.2 Requirements for Alternate 1 (Side-By-Side) Placement Method

The alternate requirements for this method allow for placement of three bundles of packaged transite panels in a side by side configuration. The side by side configuration is shown in Figure 8-3. The transite bundles shall be oriented relative to north and south as shown in Figure 8-3. Bundles of the same size shall be grouped together whenever possible. Bundles can be stacked, such that their combined height is 4 ft or less. When bundles of various dimensions are placed in a single group, their orientation shall be such that zones are not created which hamper the placement of Category 1 material. Examples of preferred groupings of different size bundles are shown in Figure 8-5.

Place bundles in contact with minimum space between each other. However, it is recognized that a space between bundles may occur. Space between the bundles shall not be more than 2 in. If space between the bundles is wider than 2 in. spaces shall be filled with a quickset grout or flowable cohesionless material. Filling of the space can be performed after Category 1 material is placed around the bundles. If grout is used, it shall be allowed to set for a minimum of four hours prior to the placement of Category 1 material over the transite bundles.

8.4.2.3 Requirements for Alternate 2 (End-By-End) Placement Method

The alternate requirements for this method allow for placement of three bundles of packaged transite panels in an end-to-end configuration. The end-to-end placement configuration is shown in Figure 8-4. Transite bundles shall be oriented relative to north and south as shown in Figure 8-4. Bundles of the same height shall be grouped together whenever possible. Bundles can be stacked, such that their combined height is 4 ft or less. When bundles of various heights are placed in a single group, their orientation shall be such that zones are not created which hamper the placement of Category 1 material.

Place bundles in contact with minimum space between each other. However, it is recognized that a space between bundles may occur. Space between the bundles shall not be more than 2-in. If space between the bundles is wider than 2 in., spaces shall be filled with a quickset grout or flowable cohesionless material. Filling of the space can be performed after Category 1 material is placed around the bundles. If grout is used it shall be allowed to set for a minimum of four hours prior to the placement of Category 1 material over the transite bundles.

8.4.3 Compaction Procedures

Each lift of soil (Category 1 material) between and above the Category 3 items shall be compacted using equipment capable of achieving compaction to at least 85 percent with rolling average of 90 percent of the standard Proctor maximum dry density, determined as described in Section 7.4.2 of this IMP Plan. It is anticipated that the compaction moisture content for this Category 1 material will be within ±3 percentage points of the material's optimum moisture content. Specific requirements for compaction moisture content will be established by the Construction Manager during construction. These requirements will take into account the workability of the Category 1 material, the required shear strength to obtain adequate levels of OSDF stability, moisture contents needed to achieve dust and other fugitive dust control, and material trafficability.

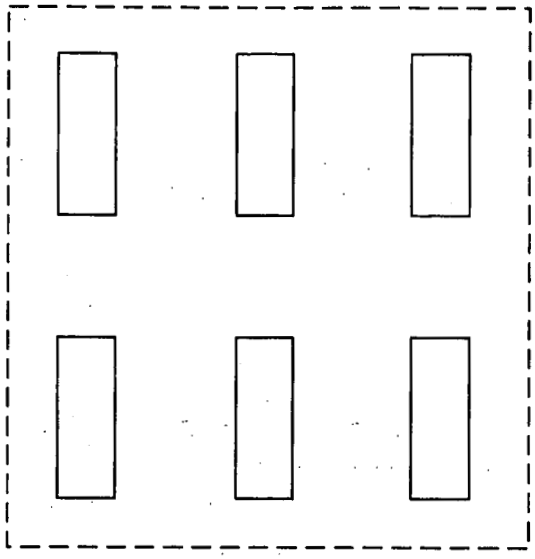
A final 12- to 15-in. thick loose lift of soil (Category 1 material) shall be placed above the Category 3 material. This final compacted lift shall be proofrolled using equipment with a minimum gross vehicle weight of 20 tons and exert a ground pressure of at least 65 psi. Soft spots indicated by tire ruts more than 3 in. in depth or visible deflection under the moving proofrolling equipment shall be stabilized through additional passes of the compactor. Any soft spot that cannot be stabilized with further compactive effort shall be cause for additional treatment to the satisfaction of the Construction Manager. This treatment shall consist of removal, replacement, and recompaction of the Category 1 material, and, if needed, infilling soft spots/areas around the Category 3 material with grout or other material approved by the Construction Manager.

In areas where groups of bundles are placed adjacent to a 2-ft high berm constructed from an adjacent grid, compaction of Category 1 impacted material shall be performed by either of the following methods.

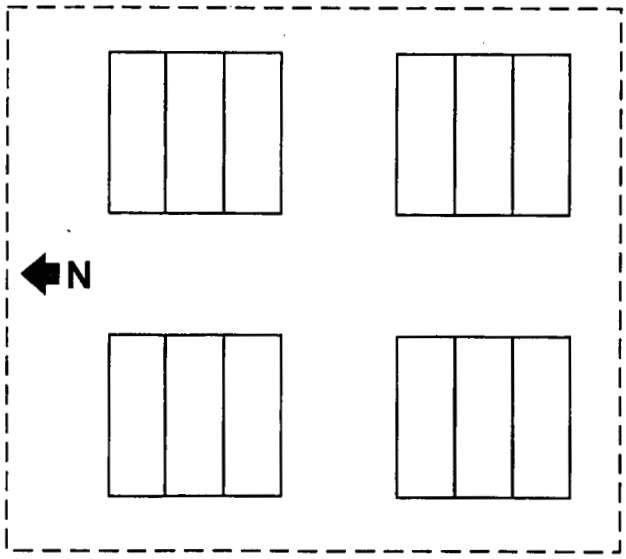
- Excavate an area of the berm in order to place and compact Category 1 material around the transite panel bundles; or
- Use a tamping plate, small roller, jumping jack or other equipment as appropriate to compact Category 1 impacted material between the berm and the transite panel bundle.

VARIOUS GROUPINGS OF BUNDLES OF PACKAGED TRANSITE PANELS

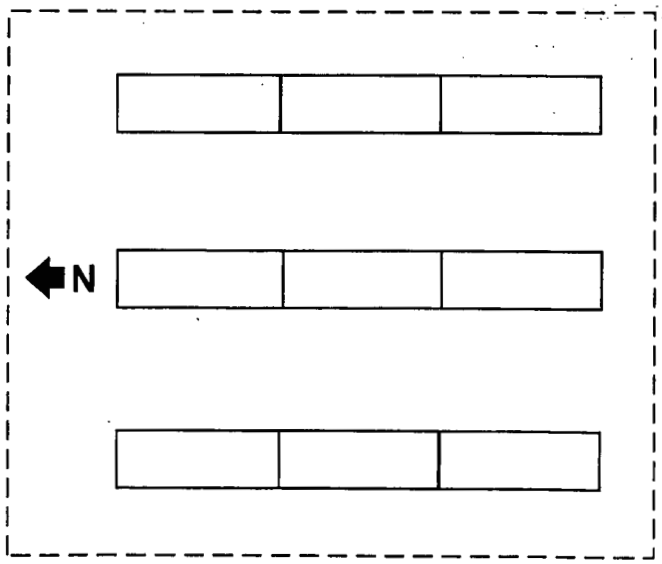
A. INDIVIDUAL PLACEMENT REQUIREMENT



B. ALTERNATIVE PLACEMENT REQUIREMENT



ALTERNATIVE 1
SIDE BY SIDE PLACEMENT



ALTERNATIVE 2
END TO END PLACEMENT

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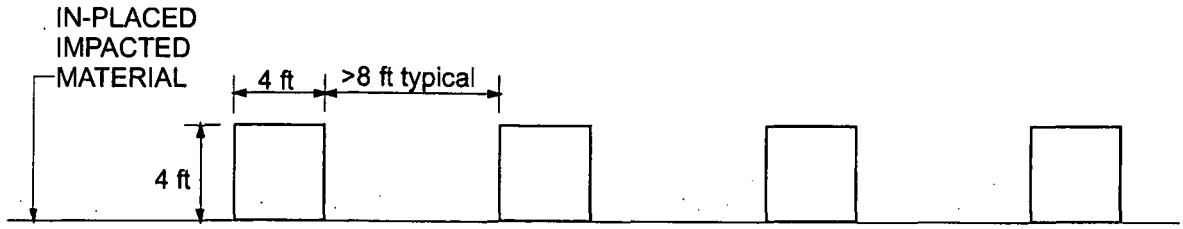
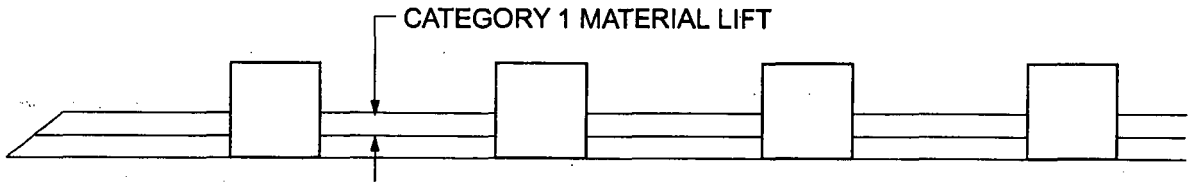
FIGURE NO.	8-1
PROJECT NO.	GQ1342-17
DOCUMENT NO.	F0130090
FILE NO.	FIGS1.cdr

3993

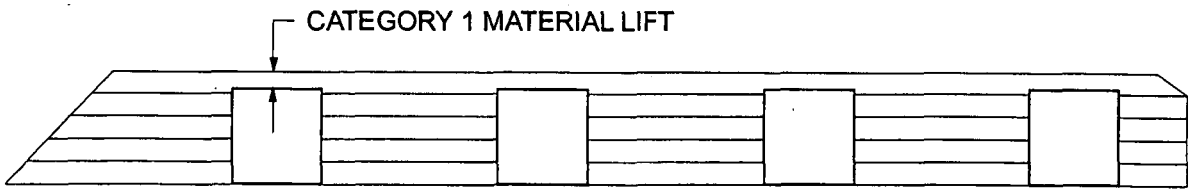
CATEGORY 3 MATERIAL PLACEMENT SEQUENCE
INDIVIDUAL PLACEMENT



1. PLACED IN A REGULAR PATTERN



2. SPACE FILLED WITH COMPACTED CATEGORY 1 MATERIAL PLACED IN 12 TO 15 INCH THICK LOOSE LIFTS



3. FINAL LIFT OF CATEGORY 1 MATERIAL PLACED ABOVE GROUPS

NOTE: THIS FIGURE FOR ILLUSTRATION ONLY. CONSTRUCTION CONTRACTOR SHALL PLACE IMPACTED MATERIAL LAYERS TO THE LIMITS SHOWN ON CONSTRUCTION DRAWINGS

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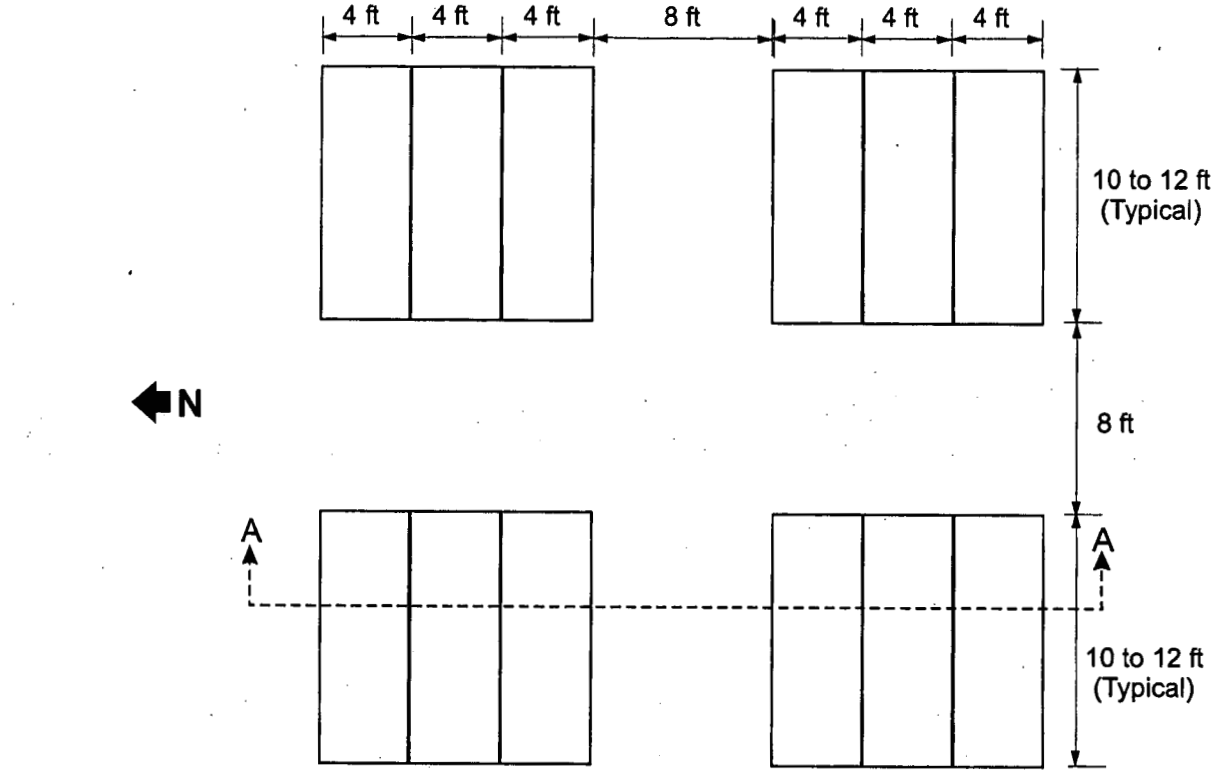
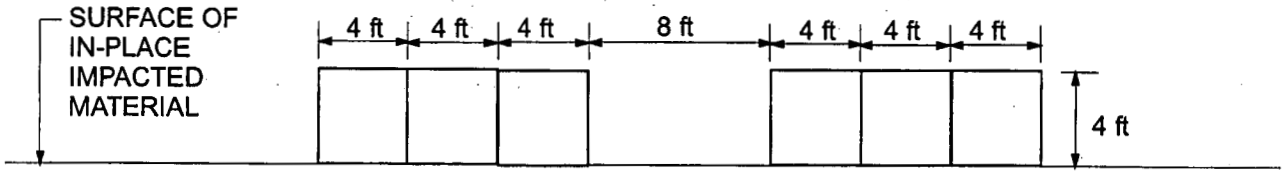
FIGURE NO.	8-2
PROJECT NO.	GQ1342-17
DOCUMENT NO.	F0130090
FILE NO.	FIGS1.cdr

000010

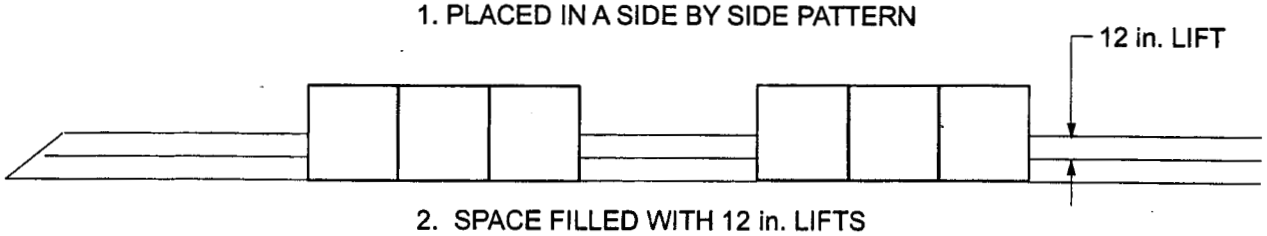
CATEGORY 3 MATERIAL - ALTERNATIVE 1 - PLACEMENT SEQUENCE



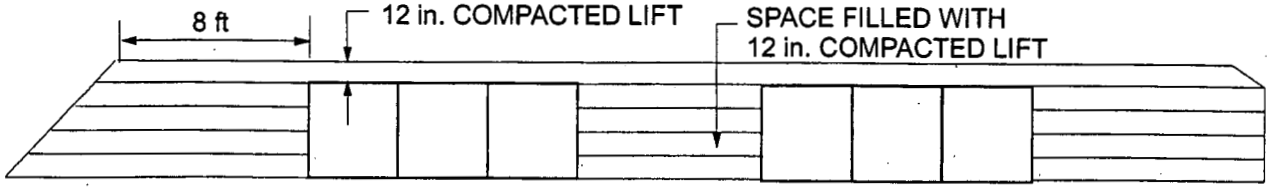
PLAN VIEW



1. PLACED IN A SIDE BY SIDE PATTERN



2. SPACE FILLED WITH 12 in. LIFTS



3. FINAL 12 in. COMPACTED LIFT PLACED ABOVE GROUPS

SECTION A - A

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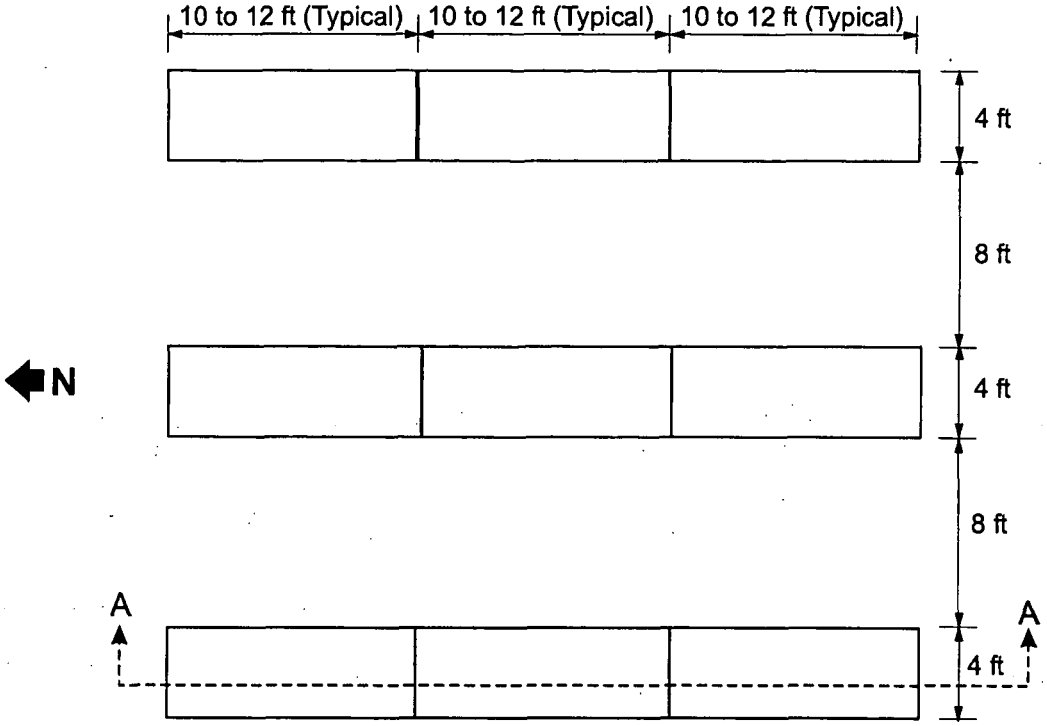
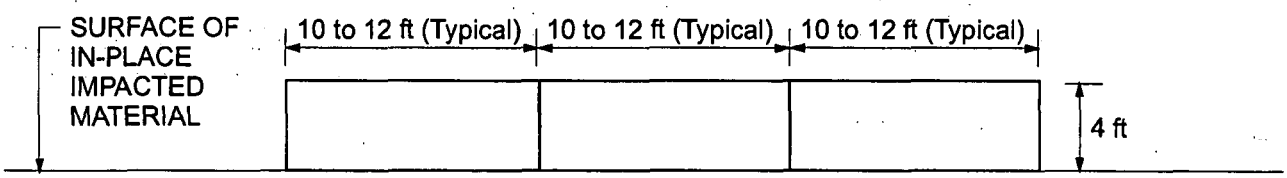
FIGURE NO.	8-3
PROJECT NO.	GQ1342-17
DOCUMENT NO.	F0130090
FILE NO.	FIGS1.cdr

CATEGORY 3 MATERIAL - ALTERNATIVE 2 - PLACEMENT SEQUENCE



PLAN VIEW



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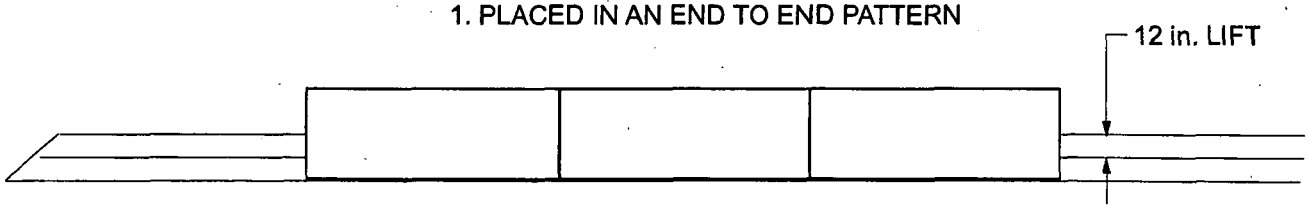
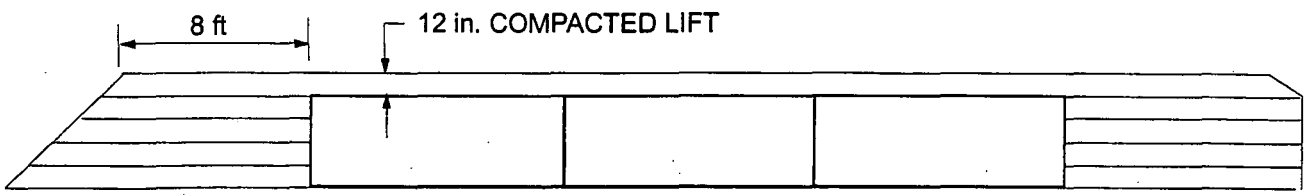


2. SPACE FILLED WITH 12 in. LIFTS



3. FINAL 12 in. COMPACTED LIFT PLACED ABOVE GROUPS

SECTION A - A

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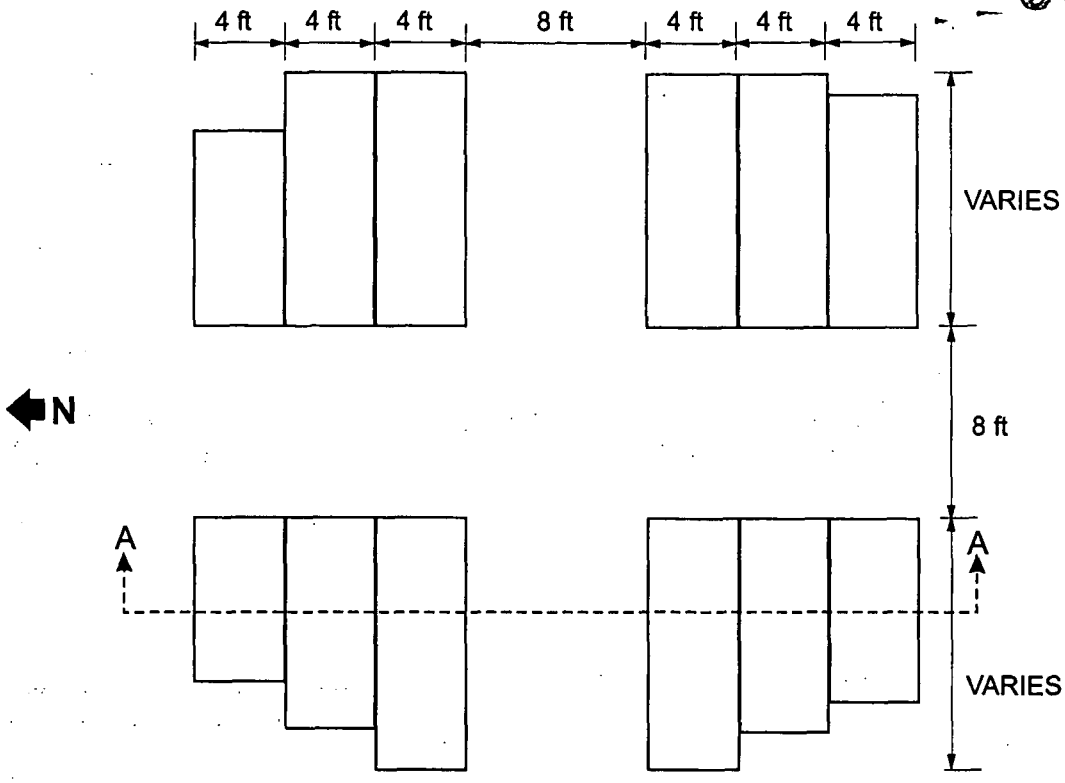
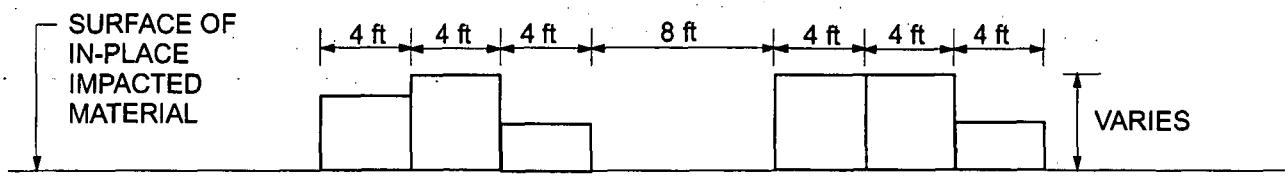
FIGURE NO.	8-4
PROJECT NO.	GQ1342-17
DOCUMENT NO.	F0130090
FILE NO.	FIGS1.cdr

GROUPING OF BUNDLES OF VARYING DIMENSIONS

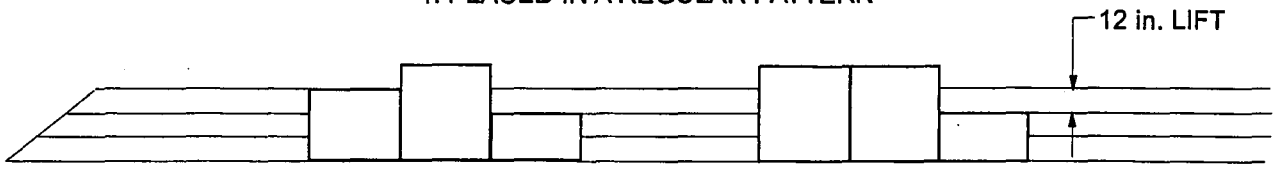
3993



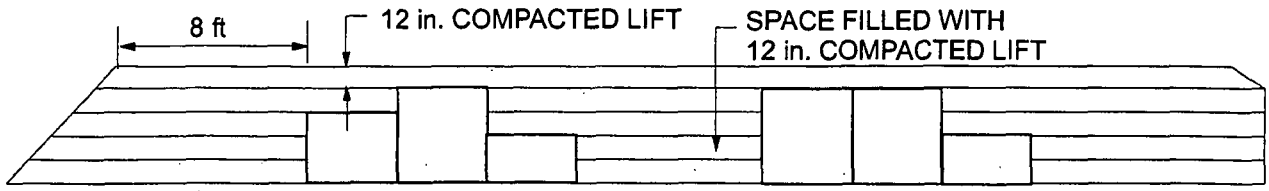
PLAN VIEW



1. PLACED IN A REGULAR PATTERN



2. SPACE FILLED WITH 12 in. LIFTS



3. FINAL 12 in. COMPACTED LIFT PLACED ABOVE GROUPS

SECTION A - A

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FIGURE NO.	8-5
PROJECT NO.	GQ1342-17
DOCUMENT NO.	F0130090
FILE NO.	FIGS1.cdr

000013

8.5 Category 4 Materials (Highly Compressible)

8.5.1 Placement Procedures

Category 1 material berms which are a minimum of 12-in. high shall be placed around Category 4 material and placed as described in Section 7.4 of this IMP Plan. The lateral extent of each Category 4 material placement shall not exceed 100 ft Category 4 material shall be placed adjacent to the berms to a loose thickness of approximately 18 in. Green waste shall be reduced in size, as necessary, to enable placement in the lift Initial compaction shall be accomplished as the material is spread by tracking with a bulldozer of a minimum total weight of 50,000 lbs producing a ground pressure of at least 10 psi, or with a landfill compactor (*e.g.*, Caterpillar 826 or approved equal). Prior to placement of the succeeding lifts of Category 4 material, a minimum 12-in. thick loose lift of Category 1 material shall be placed over the Category 4 material and compacted as indicated below. Compaction of the second lift of Category 4 material shall be identical to the first lift Not more than two lifts of Category 4 material shall be placed in a horizon. Category 4 horizons shall not be in the same vertical plane as previously placed Category 4 horizons.

8.5.2 Compaction Procedures

After spreading and initial compaction, the Category 4 material shall be compacted by minimum of four passes of a self-propelled, static pad/blade-foot landfill compactor (*e.g.*, Caterpillar 826, or approved equivalent). After each sequence of Category 4 material compaction and Category 1 cover material placement, the Category 1 cover material shall be compacted as required, as described in Section 7.4 of this IMP Plan. The Category 1 cover material shall then be proof-rolled. The proofrolling equipment shall have a minimum gross vehicle weight of 20 tons and exert a ground pressure of at least 65 psi. Soft spots indicated by tire ruts more than 3 in. in depth or visible deflection under the moving proofrolling equipment shall be stabilized through additional passes of the landfill compactor. Any soft spot that cannot be stabilized with further compactive effort shall be cause for additional treatment to the satisfaction of the Construction Manager. This treatment shall consist of removal, replacement, and recompaction of the Category 1 material, and, if needed, infilling soft spots/areas in the

Category 4 material with grout or other material approved by the Construction Manager.

8.6 Category 5 Materials (Special Handling, Placement and Compaction)

8.6.1 Introduction

Category 5 materials are materials that require special handling, placement and compaction procedures. These materials will be classified and designated in accordance with the approved RODs and the WAC. This section of the IMP Plan establishes procedures for disposal of impacted material that require special handling.

Materials either nominally larger than the physical criteria for the OSDF as identified in Section 4.3 (Physical Criteria) of this IMP Plan, or not reasonably anticipated by the currently identified categories in this IMP Plan, will require specialized placement plans to be developed on an as needed basis. Such plans would be developed by the OSDF project team and submitted to the regulatory agencies for review and approval prior to utilization. It is anticipated that such plans would be submitted concurrent with remedial action planning documents, which identify items for special handling, or following the discovery of unexpected materials outside the current categorizations. Once approved, these specialized placement plans either would become addenda to this IMP Plan, as indicated in Appendix C, or the appropriate section(s) of this IMP Plan would be revised accordingly.

8.6.2 General

Impacted materials suitable for placement in the OSDF that require special handling include:

- highly-compressible impacted materials not suitable for lateral spreading as a Category 4 material (*e.g.*, double-bagged asbestos);
- piping insulated with asbestos containing material (ACM); and

- sludges.

Placement and compaction procedures for these types of impacted materials are presented below or in Appendix C.

8.6.3 Highly Compressible Materials

Placement

The volume of highly compressible material, such as double-bagged asbestos, requiring OSDF disposal is very limited. The primary criterion regarding the placement of asbestos is that the material be placed in a manner protective of the health of OSDF personnel and the public. A secondary criterion is to prevent significant differential settlement of the OSDF final cover system resulting from compression of this material.

Prior to placement of any highly compressible material in the OSDF, a trench shall be dug into previously placed and compacted Category 1 material. Material excavated from this trench shall be stockpiled at least 6 ft away from the trench opening. No trenches shall be dug into layers containing Category 2 through 5 material, nor through the protective, contouring, or select impacted material layers. Trenches shall be of uniform width (between 2.0 and 3.0 ft wide) and of a uniform depth (between 3.0 and 4.0 ft deep). The final sizing of the trench shall depend on the nature and size of the material to be disposed. The trenches shall be at a minimum 6 ft apart from one another. Highly compressible material, such as double-bagged asbestos, shall be deposited in the lower half of the trench.

Compaction

An initial Category 1 material cover between 12 and 18 in. loose thickness shall be placed on top of the highly-compressible material in the trench. The initial Category 1 material cover layer shall be compacted with a minimum of four passes of a portable flat-plate or miniature roller compactor. Intermediate 6- to 12-in. thick loose Category 1 material lifts shall be placed in the trench and compacted to at least 90 percent of the standard Proctor maximum dry density determined as described in Section 7.4.2 of this IMP Plan. A final trench Category 1 material lift shall be placed and compacted to at

least 90 percent of the standard Proctor maximum dry density. The surface of the compacted final lift shall be at least 2 in. above the trench shoulders. The sequencing of material placement is illustrated in Figure 8-6.

8.6.4 Piping Containing ACM Insulation

Placement

The disposal of ACM-insulated piping in the OSDF shall be performed in a manner protective of the health of OSDF personnel and the public. These materials must be segregated from other demolition debris at the source and delivered to the OSDF in a condition suitable for placement in an excavation dug into previously placed and compacted Category 1 material. The size and shape of the excavation will be based on the predominant dimension and condition of the piping. If the piping comes to the OSDF in relatively straight lengths, the pipes shall be placed in trenches similar to those required for double bagged asbestos. If the piping comes to the OSDF in random shapes, bends, or curvatures, the pipes shall be placed in a rectangular excavation sized to accommodate the pipe but not greater than 20 ft by 20 ft square and 4 ft deep. Pipe should be cut to lengths allowing placement in the 20-ft square excavation and be placed such that Category 1 material can be filled around pipes. The number of pipes placed in the 20-ft square excavation is limited to that number that can be placed such that Category 1 material in-filling around the pipes is possible. The ACM-insulated piping shall be placed in the lower half of the excavation.

Compaction

An initial Category 1 material loose lift between 12 and 18 in. thick shall be placed on top of the ACM-insulated piping in the excavation. The initial Category 1 material cover layer shall be compacted with a minimum of four passes of a portable flat-plate or miniature roller compactor or a pad-foot compactor such as the Caterpillar 815C as appropriate. Intermediate 6 to 12 in. loose Category 1 material lifts shall then be placed in the excavation and compacted to at least 90 percent of the standard Proctor maximum dry density, determined as described in Section 7.4.2 of this IMP Plan. A final excavation Category 1 material lift shall be placed and compacted to at least 90 percent

of the standard Proctor maximum dry density. The surface of the compacted final lift shall be at least 2 in. above the excavation shoulders.

8.6.5 Sludges

The placement, spreading, and compaction of the sludge material from the Lime Sludge Ponds or the AWWT will depend on the water content of the sludge when delivered to the OSDF. Prior to delivery for OSDF placement, sludge materials from the Lime Sludge Ponds should be mixed with soils from the berms of the ponds or other soil material as much as practicable during excavation and handling. The sludge material shall be dried until excessive moisture is removed. The objective of this activity is to decrease the moisture content of the sludges and thereby improve their handling and subsequent compaction characteristics. The Construction Manager may specify additional source(s) of materials for mixing with the sludges to achieve the required handling and placement characteristics.

The following two procedures are alternatives (Procedures 1 and 2) for sludge placement. They both assume the sludge can be placed and compacted with conventional construction equipment, either by mixing as above in the case of the Lime Sludge Ponds, or by proper preconditioning (dewatering or drying) in the case of the AWWT sludges. In no case shall mixing and preconditioning be performed in the OSDF active cell to achieve the criteria identified in Section 4.3 of the IMP Plan. The Construction Manager will select the appropriate procedure of placement based on availability of Category 1 soils or Category 2 D&D debris, consistency of sludge material, and location of placement within the cell.

Procedure 1

Placement

Sludges or sludges mixed with soils (hereafter referred to as sludges), with a moisture content which does not result in excessive "bleeding" of liquids, may be placed to a maximum loose lift thickness of 12 inches within starter (or perimeter) berms. These berms shall be constructed of Category 1 soil material; they shall be approximately 24 inches high and have a width of approximately 10 feet. The berms

shall be placed and compacted in 12- to 15-inch thick loose lifts in accordance with the IMP Plan. A trackhoe may be used to spread the in-place sludge to achieve the maximum loose lift thickness requirement. Category 2 material (D&D debris) may then be placed on top of the sludges and inside the starter berms.

Compaction

The Category 2 material shall be placed and compacted (including proof rolling) in accordance with Section 8.3 of the IMP Plan. Category 1 soil material cover shall be placed and compacted on top of the Category 2 material as described in Section 8.3 of the IMP Plan. After placement and compaction of the Category 1 material, a second lift of sludge material followed by Category 2 material may be placed by constructing a second starter berm, as shown on Figure 8-7. The second lift of sludge/Category 2/Category 1 materials shall be constructed in the same sequence as the first lift. After the second lift of sludge/Category 2/Category 1 materials, there shall be a minimum 4 foot thickness of an intervening horizon of Category 1 material before placement of either Category 2 or sludge/Category 2 materials, as described in Section 8.3 of the IMP Plan.

Procedure 2

Placement

Sludges or sludges mixed with soils (hereafter referred to as sludges) that are free of liquids may be placed to a maximum loose lift thickness of 12-inches within starter (or perimeter) berms. These berms shall be constructed of Category 1 material; they shall be approximately 24 inches high and have a width of approximately 10 feet. The berms shall be placed and compacted in 12- to 15-inch thick loose lifts in accordance with the IMP Plan. A trackhoe may be used to spread the in-place sludge to achieve the maximum loose lift thickness requirement.

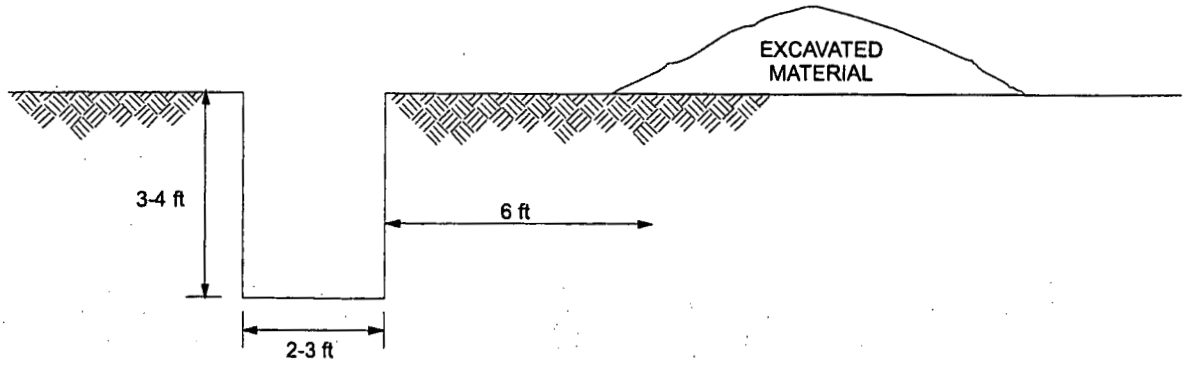
Compaction

Initial compaction of sludges shall be accomplished as the material is spread. After spreading and initial compaction, the sludge material shall be compacted by a minimum of four passes of a bulldozer of a minimum total weight of 50,000 lbs. producing a

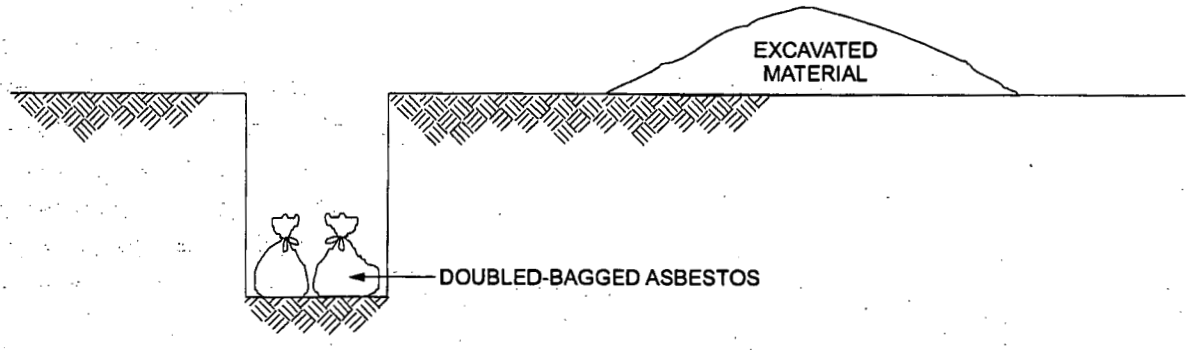
ground pressure of at least 10 psi. Prior to placement of the second and succeeding lifts of sludge materials, a 12 inches to 15 inches thick lift of Category 1 material shall be placed above the sludge lift and compacted to at least 85 percent of the standard Proctor maximum dry density. After placement of the Category 1 material lift, another starter berm shall be constructed as with the first lift of sludge material. Compaction of all succeeding lifts of sludge materials shall be identical to the first lift Not more than two lifts of sludge material shall be placed in a horizon without at least the minimum 4 feet required thickness of intervening horizon of Category 1 material.

After each sequence of sludge and covering Category 1 material placement, the cover Category 1 material shall be proofrolled. The proofrolling equipment shall have a minimum gross vehicle weight of 20 tons and exert a ground pressure of at least 65 psi. Soft spots indicated by tire ruts more than 3 inches in depth or visible deflection under the moving proofrolling equipment shall be stabilized through additional passes of the compactor. Any soft spot that cannot be stabilized with further compactive effort shall be cause for additional treatment to the satisfaction of the Construction Manager. This treatment shall consist of removal, replacement, and recompaction of the Category 1 material, and, if needed, infilling soft spots/areas in the sludge material with grout or other material approved by the Construction Manager.

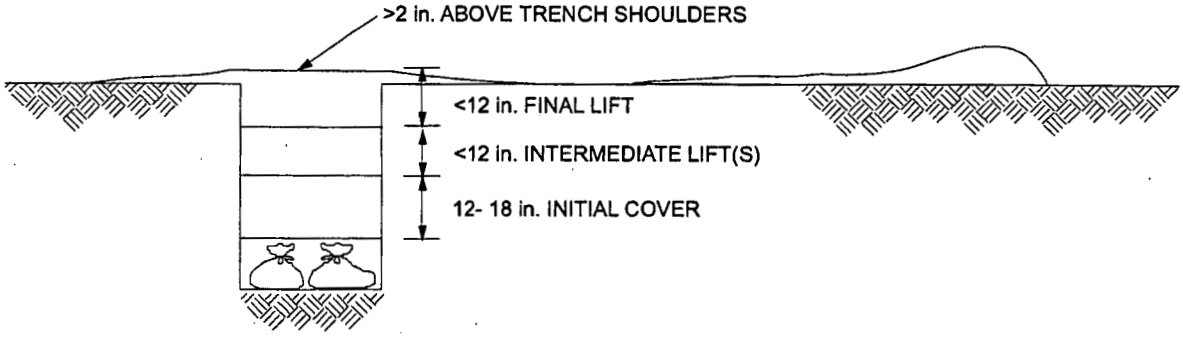
CATEGORY 5 MATERTIAL PLACEMENT SEQUENCE



1. TRENCH DUG AND EXCAVATED MATERIAL STOCKPILED



2. CATEGORY 5 MATERIAL DEPOSITED IN TRENCH



3. FINAL TRENCH LIFT PLACED

NOTE: THIS FIGURE FOR ILLUSTRATION ONLY. CONSTRUCTION CONTRACTOR SHALL PLACE IMPACTED MATERIAL LAYERS TO THE LIMITS SHOWN ON CONSTRUCTION DRAWINGS

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FIGURE NO.	8-6
PROJECT NO.	GQ1342-17
DOCUMENT NO.	F0130090
FILE NO.	FIGS1.cdr

SLUDGE PLACEMENT

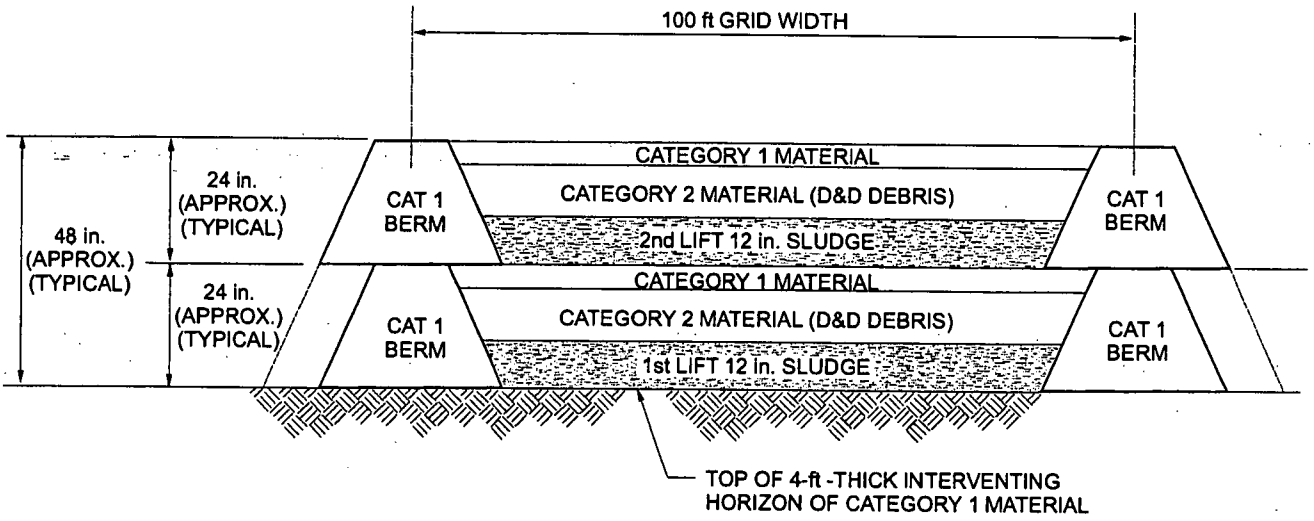

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FIGURE NO.	8-7
PROJECT NO.	GQ1342-17
DOCUMENT NO.	F0130090
FILE NO.	FIGS1.cdr